INTEX-NA Flight 9: July 18, 2004

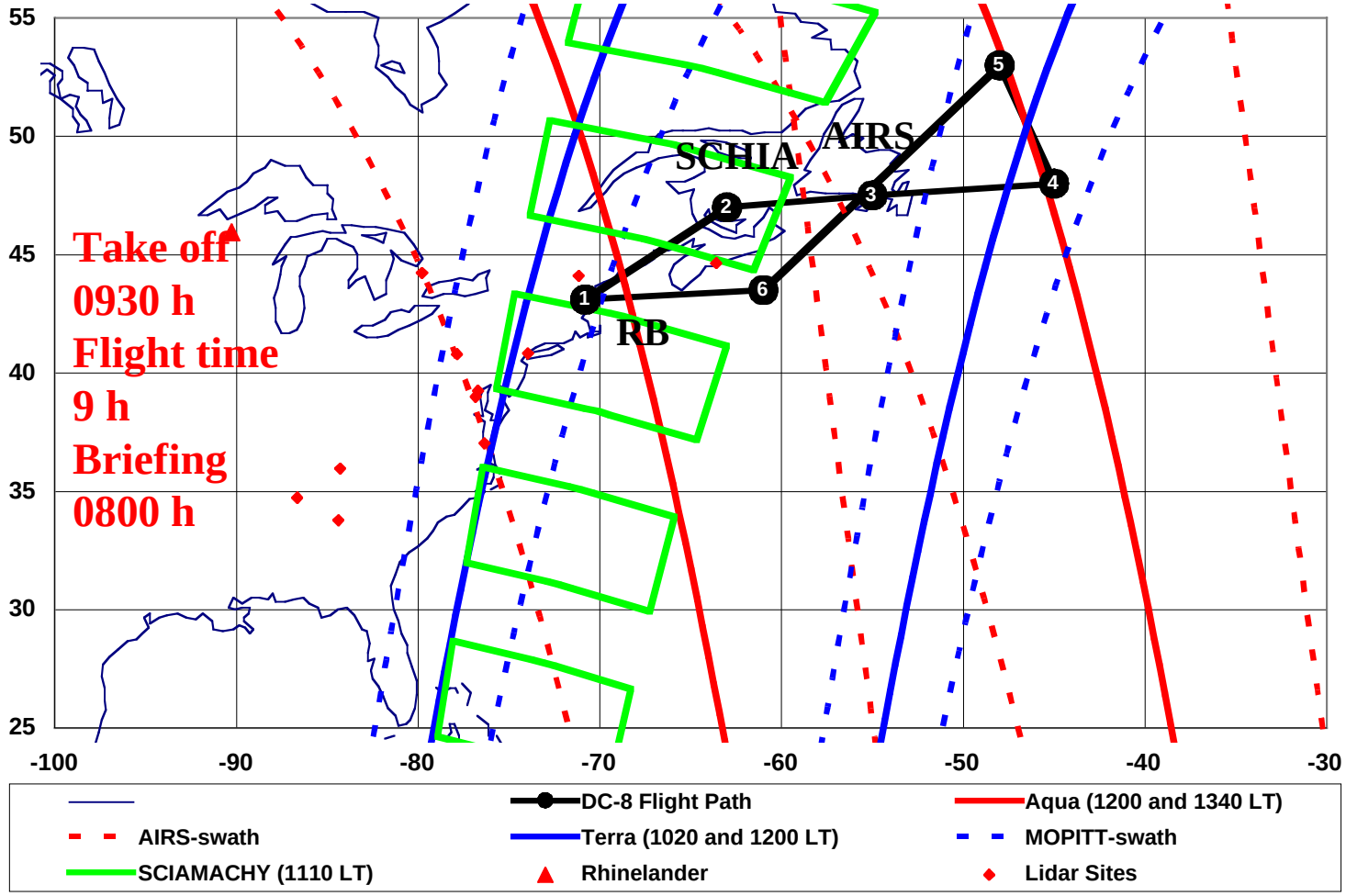
This was the first DC-8 science flight from New Hampshire (Pease AFB). The salient science objectives were validation of Envisat (SCHIA) and Aqua (AIRS, MODIS) satellite instruments, a first attempt at the Lagrangian experiment, characterization of North American pollution outflow, possible characterization of Alaskan fires, and a flyby over the NOAA ship Ron Brown.The flight was guided by meteorological analysis and forecasts from multiple models with in-flight adjustments based on the UV lidar. Total flight duration was 9 hours with a nominal 9:30 am takeoff. Basic flight patterns and there location are shown in the slides below.

Meteorological conditions at the surface included a developing low pressure center over the Carolinas. This low produced widespread cloudiness over the western half of the flight track. These clouds increased in coverage during the flight. There were fewer clouds over the eastern section of the flight. The flow in the middle and upper troposphere was split. North of the U.S. – Canadian border, the winds mostly were from the west. Farther south, the flow was more amplified, with a major trough or closed low over the Atlantic Coast and a closed high over the Rockies.

The initial low level northeast leg (1000 ft) encountered the expected anthropogenic pollution from the Northeast. This low level region was also forecasted to be accessible from Azores within the next several days and constituted over first attempt at a Lagrangian experiment. The UK group based in Azores were alerted to this possibility. The severity of this outflow event was moderate (CO-160 ppb; O3-50; SO2-1 ppb) but signals were sufficient strong for tracking these air masses. The DC-8 did a spiral (1000-33000 ft) under Envisat at 1110 LT coincident with its nadir position. A second spiral for AIRS validation also occurred at 1600z. Both of the spirals occurred under relatively cloud free conditions with surface features a mix of l;and and water. A thick layer of pollution was also present between 20-30000 ft with O3 in the range of 75-125 ppb and was indicative of deep convection. Some stratospheric air was entrained at the very upper levels with O3 exceeding 175 ppb at 35000 ft. At the northeastern tip of the flight track a dominant plume with signatures of biomass combustion was intersected at 23000 ft. These layers contained CO in excess of 600 ppb and highly absorbing aerosol but only modest O3 (60 ppb). These Alaskan fire signatures were observable between 12000-30000 ft with multiple layers in between. On the return track we encountered anthropogenic pollution at very low altitudes (1000 ft) that contained much higher O3 (>125 ppb) than was observed over the initial northeast leg. A coordinated flyby over the Ron Brown was successfully executed with DC-8 flying at 500 ft above the Ron Brown under foggy conditions. Overall, this was a very successful flight that achieved all of the planned science objectives

The navigational data are available at URL: http://www.dfrc.nasa.gov/Research/AirSci/DC-8/ICATS/index.html

INTEX Flight #9 Plan – Pease Local #1 on 7/18
plan last updated 7/17 @15Z



Objectives: Boundary layer pollution outflow throughout flight, Lagrangian opportunity (leg 1-2 for BL, higher altitudes throughout), possible Asian influence and/or smoke/fire emissions in free troposphere, Scia underflight (point 2), Aqua underflight (point 3), and Ron Brown flyby if possible.

DC-8 NASA 817 INTEX July 18

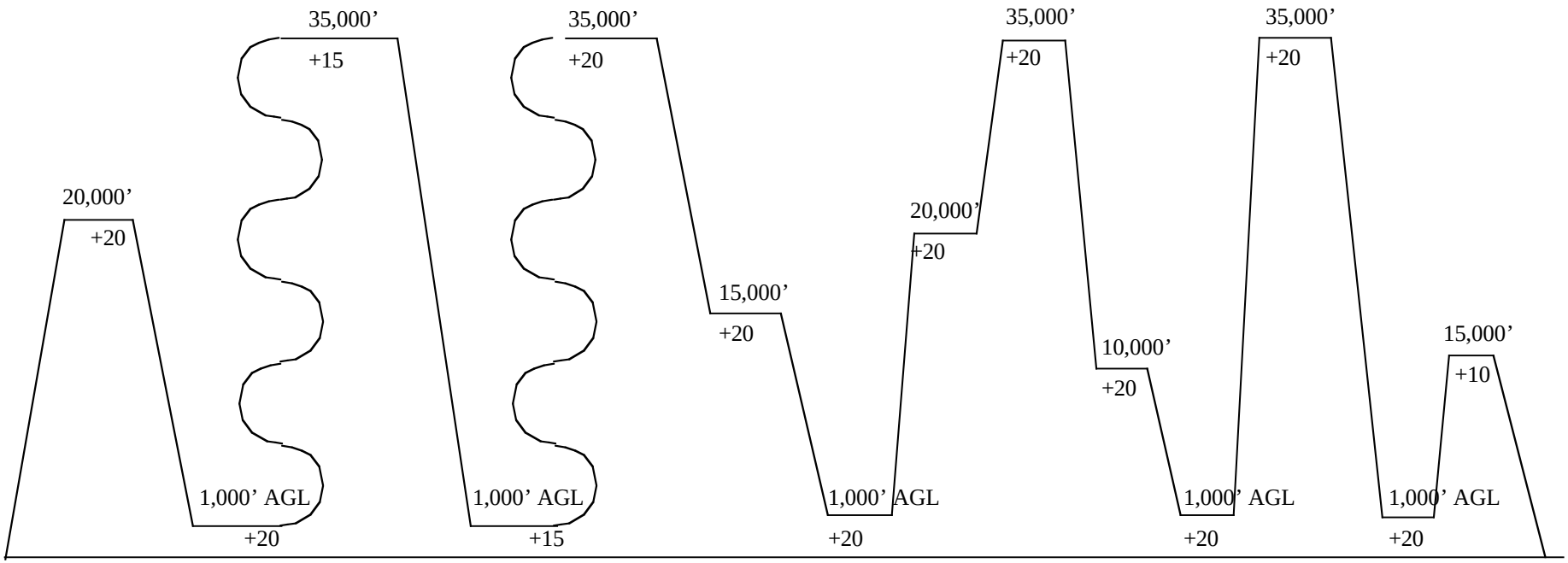
SPIRAL CLIMBS

to 10,000 msl @1,000 fpm

then 1500 fpm

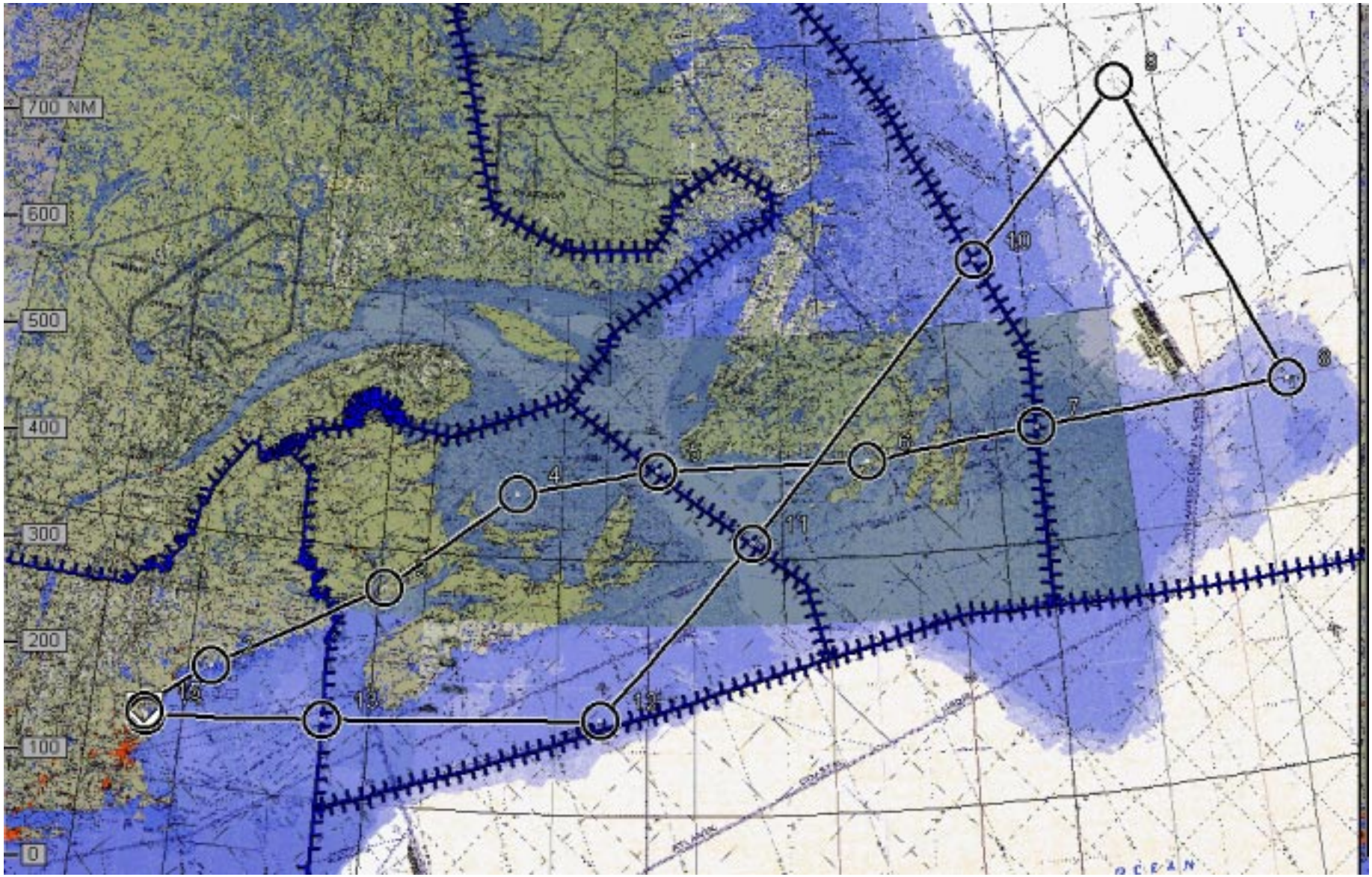
ALL ENROUTE CLIMBS/DESCENTS

1500 FPM



PSM PT4 PT6 PT8 DENDU FORTE PT12 PSM

DC-8 NASA 817 INTEX 18 JUL 04



TYPE ACFT	CALL SIGN	DATE	FROM	TO	PLND TO	ACT TO	PILOT	COPILOT
DC-8	NASA817		PEASE INTL TR N 43 04.7 W070 49.4	PEASE INTL TR N 43 04.7 W070 49.4	13:30			

TOT DIST	TOT TIME	FUEL REQ	NAVIGATOR	ENGINEER
2673.2	09+04	93187		

TP DTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
1	KPSM/A PEASE INTL TR		N 43 04.7 W070 49.4	100M		329 345	5.0 2668	00+00 09+04	13:30			
2	SEAER/W SEAER		N 43 55.5 W069 29.5	20000M	330 330	053 070	76.4 2592	00+14 08+50	13:44			
3	YSJ/E SAINT JOHN	082X 113.50	N 45 24.4 W065 52.2	20000M	330 330	060 078	178.7 2413	00+33 08+18	14:16			
4	.PT4 none	082X 113.50	N 47 00.0 W063 00.0	20000M	330 330	051 071	153.1 2260	00+28 07+50	14:44			
	.delay	082X 113.50	N 47 00.0 W063 00.0	20000M	330 330	051 072	0.0 2260	00+25 07+25	15:09			
5	JIGGS/W JIGGS		N 47 25.2 W059 48.2	20000M	330 330	079 100	133.2 2127	00+24 07+01	15:33			
6	.PT6	082X 113.50	N 47 30.0 W055 00.0	20000M	330 330	089 110	195.6 1931	00+36 06+25	16:09			
	.delay	082X 113.50	N 47 30.0 W055 00.0	20000M	330 330	089 110	0.0 1931	00+25 06+00	16:34			
7	NOVEP/W NOVEP		N 47 49.7 W051 00.0	20000M	330 330	083 104	163.4 1768	00+30 05+30	17:04			
8	.PT8		N 48 00.0 W045 00.0	20000M	330 330	088 108	242.3 1525	00+44 04+46	17:48			
9	.PT9		N 53 00.0 W048 00.0	20000M	330 330	339 360	321.5 1204	00+58 03+48	18:46			
10	DENDU/W DENDU		N 50 30.2 W052 04.1	20000M	330 330	225 248	213.3 991	00+39 03+09	19:25			
11	FORTE/W FORTE		N 46 16.8 W057 39.6	20000M	330 330	221 243	337.9 653	01+01 02+08	20:26			
12	.PT12		N 43 30.8 W061 00.6	20000M	330 330	221 241	219.0 434	00+40 01+28	21:06			

TP	Fix/Point	FREQ	Latitude	Alt	TAS	TC	LEG DIST	LEG TIME	ETA	RETA	ATA	REMARKS

DTG#	Description		Longitude	Wind	GS	MC	DIST REM	TIME REM				
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14	YOKNS/W YOKNS		N 43 00.0 W070 45.6	20000M	330 330	265 282	166.3 5	00+30 +10	22:24			
15	KPSM/A PEASE INTL TR		N 43 04.7 W070 49.4	100M		329 345	5.5 0	00+10 +00	22:34			